GIET MAIN CAMPUS AUTONOMOUS,
GUNUPUR - 765022

Registration No: | | | | | | | | | | | **M.TECH**

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M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018

INFORMATION THEORY & CODING

Branch: EC, Subject Code:MECPC1020

(Regulations 2017)

Time: 3 Hours **Max Marks : 70** **Question Code: SD18002018**

PART-A (10 X 2=20 Marks)

1. Answer the following questions.

a. Define information and Write the properties of information.
b. What is the capacity of the channel having infinite bandwidth?
c. Define Information rate.
d. What is meant by linear code?
e. What is meant by constraint length and free distance for convolution code?
f. Describe the principle of static Huffman coding.
g. What are the types of JPEG algorithms?
h. What is meant by cyclic code?
i. Enumerate the principle of data compression?
j. List the properties of generator polynomial of cyclic codes.

PART-B (5 X 10=50 Marks)

Answer any five questions from the following.

2. a) Derive the expression for conditional entropy & joint entropy. [5]
   b) State and explain Shannon Hartley theorem. [5]

3. a) Discuss the MPEG compression techniques [5]
   b) A discrete memory less source X has five symbols x1,x2,x3,x4 and x5 with probabilities p(x1) =0.4, p(x2) = 0.19, p(x3) = 0.16, p(x4) = 0.15 and p(x5) = 0.1 . Construct a Shannon – Fano code for X, and Calculate the efficiency of the code. [5]

4. a) Show that I (X;Y) = H (X)+ H (Y) - H (X,Y). [5]
   b) With a block diagram, explain the JPEG encoder and decoder. [5]

5. A convolution encoder is defined by the following generator polynomials: g0(x) = $1+x+x^2+x^3+x^4$
   $g1(x) = 1+x+x^3+x^4$
   $g2(x) = 1+x^2+x^4$
   a) What is the constraint length of this code? & What is the code rate of this code? [4]
   b) How many states are in the trellis diagram of this code [6]

6.a).Explain the Iterative MAP decoding scheme used to code conventional codes. [5]
   b). Construct the addition and multiplication table for $F[x]/(x^2+1)$ defined over GF(3). [5]

7. a) How to find the parity check matrix? [5]
   b) Give the syndrome decoding algorithm [5]

8.Write short notes on
   a) Data encryption standard [5]
   b) Channel capacity theorem [5]

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